

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Appl. No. : 10/565,256  
Confirmation No. : 7969  
Applicant : HARGRAVES, Donald Edwin  
Filed: : 01/19/2006  
Title : PUMP VALVE WITH CONTROLLED STROKE  
TC/A.U. : 4114  
Examiner : ELAADIL, LAHCEN  
Docket No. : 2974/5US  
Customer No. : 23638

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**Mail Stop Amendment**  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**DECLARATION**

I, Bradley L. Hoover, declare under 37 CFR 1.132, the following:

1. I graduated from Bradley University in 1985 with a B.S. in Electrical Engineering. For the past 23 years I have worked as an engineer in the general field of controls and automation. During that time I have extensive experience with precision pumps and associated check valves. My experience includes specifying precision

pumps having various types of check valves and specifying the type and performance of the check valves themselves. As a result, I am very familiar with check valves for precision pumps and the criteria used for their design.

2. I have read and understood the written description and drawings of United States Patent Application No. 10/565,256. The '256 application discloses a valve assembly for a diaphragm pump that includes a pump head and a pump chamber that form an inlet valve compartment and an outlet valve compartment. The compartments are each configured to receive a check-valve element that is movable between a closed position and an open position. In the closed position, the valve element is positioned against a valve seat. In the open position, the valve element is spaced-away from the valve seat and in contact with the walls of the compartment. In other words, the travel of the valve element is limited by the dimensions of the compartment. One effect of this is that the valve element can not be in a position of over-travel because the motion of the valve element is constrained by the compartment. Another effect is that the valve element is not in a conventional fully-opened position and the flow through the check valve is restricted more than if the valve element were in a fully extended position.

3. Despite my extensive experience with this type of pump and the check valves that are associated with it, I would not have designed a pump where the valve element contacts the housing prior to learning of the invention disclosed in the '256 application. Prior to this invention, the extent of travel of check valve elements was not limited. If the travel of a check valve element was limited, the flow through the valves would be restricted. To the best of my knowledge, check valves that were in existence prior to the invention are designed to move quickly between a closed state and a fully opened

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state in which the flow of fluid through the check valve is substantially unrestricted by the valve element.

For these reasons, I would have always designed a valve compartment for receiving the valve element of a check valve such that the valve element was not restricted by the compartment when the valve element is in the open position. In this regard, if the extent of travel of a valve element in a check valve is limited by the housing, flow of the a fluid through the valve more than if the extent of travel of the valve element was not restricted. Accordingly, I would not have designed a check valve for a precision pump where the valve element contacts the compartment.

5. Now that I have reviewed the above-referenced application, I can see the advantages of such a configuration when used in the type of pumps disclosed in this application.

All statements made herein of my own knowledge are true, all statements made herein on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001, and may jeopardize the validity of the application or any patent issuing thereon.

Date: April 25, 2008

  
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Bradley L. Hoover